

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

October 26, 2010

TO: Internal File *DRH*

THRU: Ingrid Campbell, Lead *WC*

FROM: Steve Christensen, Hydrologist *SKC*

RE: Mine Water Treatment/Catchments C and E, West Ridge Resources, Inc., West Ridge Mine, C/007/0041, Task ID #3661

SUMMARY:

On July 21, 2010, the Division of Oil, Gas and Mining (the Division of Oil, Gas and Mining) issued West Ridge Resources, Inc. (the Permittee) a Notice of Violation (NOV #10063). NOV #10063 was issued due to the Permittee's failure to design, construct and maintain appropriate sediment control measures that resulted in additional contributions of sediment outside the permit area. Accumulations of coal-fine material were observed within the 'C' Canyon drainage beginning at Utah Pollution Discharge Elimination System (UPDES) Outfall 002. NOV #10063 requires corrective measures in order to abate the violation.

The corrective measures require the Permittee to: immediately begin visual inspections of the mine-water discharge at Outfall 002, submit plans for an underground mine-water monitoring/treatment system, submit plans for the reinstallation of catchments C and E within the 'C' Canyon drainage below the mine site and submit plans that outline the clean-up methods to be utilized from Outfall 002 to catchment E.

The Permittee was issued a violation for the same infraction in January of 2009 (NOV #10033). As a result of that violation, the Permittee was required to construct a series of catchments to collect the accumulated coal fine material. Four catchments were constructed (A, C, E and F). Following clean up of the drainage, catchments C, E and F were reclaimed in the fall of 2009. Catchment A was retained as a safety measure in the event of future releases of coal fine material.

On August 3rd, 2010, the Division of Oil, Gas and Mining received an amendment from West Ridge Resources, Inc. (the Permittee). The amendment (Task ID #3599) addressed the corrective measures outlined in NOV #10063 relative to the installation of catchment structures C and E as well as the clean-up methods to be utilized from Outfall 002 to Catchment E. The

Permittee proposed to reconstruct Catchments C and E exactly as was done in 2009. However, the catchments will not be reclaimed immediately following clean-up activities. The catchments will remain until such time as the Division determines that they are no longer required.

Deficiencies were identified during the technical review of the August 3rd, 2010 amendment. On October 19th, 2010, the Permittee re-submitted the amendment to address those deficiencies.

The following technical memo is the hydrologic review of the amendment relative to the State of Utah R645-Coal Mining Rules. The application meets the State of Utah R645-Coal Mining Rules relative to hydrology.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The application meets the Sampling and Analysis requirements of the State of Utah R645-Coal Mining Rules.

The construction of Catchments C and E will not require additional sampling and analysis. The approved water-monitoring program for the West Ridge facility contains three actively monitored surface water-monitoring points on the C Canyon Drainage: ST-5, ST-6 and ST-6A.

Baseline Information

The application meets the Baseline Information requirements of the State of Utah R645-Coal Mining Rules.

Baseline information for the C Canyon Drainage is presented in Appendix 7-1 of the approved MRP (*Investigation of Surface-Water and Groundwater Systems in the West Ridge Area, Carbon County, Utah, January 19th, 1998*). Based upon the results of the ground and surface water analysis conducted by the Permittee, the C Canyon Drainage is an ephemeral drainage. Steep slopes and steep stream gradients characterize the canyon. Prior to the West Ridge Mine pumping ground water encountered within the mine workings, the C Canyon Drainage behaved and was characterized as an ephemeral drainage producing flow only in response to spring snowmelt and rainfall events.

The spring and seep survey conducted by the Permittee (See Appendix 7-1 and Map 7-5, *Seep/Spring Survey Map*), identified three springs in the C Canyon watershed: Springs S-7, S-8 and S-8. Of these three springs, Spring Sp-8 is the only spring observed that produced appreciable flow. As Spring SP-8 is located over one-mile up gradient from the discharge point

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of Outfall 002, there is no potential for this spring to be impacted by the additional contributions of sediment currently discharging from the mine or from the construction and operation of the four catchments.

Probable Hydrologic Consequences Determination

The application meets the Probable Hydrologic Consequences Determination requirements of the State of Utah R645-Coal Mining Rules.

The installation of Catchments C and E in the C Canyon Drainage presents minimal potential for impacts to the hydrologic balance. As established by the baseline information presented in Appendix 7-1 of the approved MRP, the C Canyon Drainage is ephemeral, producing flow only in response to spring snowmelt and rainfall events. As a result, the retention and velocity reduction produced by the operation/retention of the three catchments presents little potential to impact the natural function and hydrologic characteristics of the C Canyon Drainage.

Each of the catchments is designed with a diversion pipe that, when utilized, is capable of routing the mine-water discharge around the sub-catchments. The diversion will allow the Permittee to effectively remove/clean-out the coal fine material from the sub-catchments.

Findings:

The application meets the Hydrologic Resource Information requirements of the State of Utah R645-Coal Mining Rules.

OPERATION PLAN

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Plans and Drawings

The application meets the Plans and Drawings requirements for Road Systems and Other Transportation Facilities as required by the State of Utah R645-Coal Mining Rules.

Catchments C and E are located on pre-existing roads outside of the existing West Ridge Permit area. As there is no new road construction associated with these catchment structures, the design and performance standards relative to road systems and other transportation facilities is not applicable.

Findings:

The application meets the Plans and Drawings requirements for Road Systems and Other Transportation Facilities as required by the State of Utah R645-Coal Mining Rules.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, **-301-745, -301-746, -301-747.**

Analysis:

Coal Mine Waste

The application meets the Coal Mine Waste requirements of the State of Utah R645-Coal Mining Rules.

On page 12 of the application, the Permittee describes how the coal-fine material will be handled and disposed of during the clean-up phase of the project. The coal-fine material that accumulates in the catchment structures will be cleaned out using a backhoe and/or a slurry pump. The removed material will then be hauled to the West Ridge Mine where it will be

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disposed of at the main coal pile. The material will later be blended back into the run-of-mine coal as part of the commercial product.

Findings:

The application meets the Coal Mine Waste requirements of the State of Utah R645-Coal Mining Rules.

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Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Water-Quality Standards and Effluent Limitations

The application meets the Water-Quality Standards and Effluent Limitations requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis (Task ID #3599) had identified a deficiency relative to the chemical to be utilized during the clean-up of the C Canyon drainage. The Permittee was directed to verify the flocculant to be utilized. On page 12 of 5-15, the Permittee states, "The flocculant to be used is Nalco 83400, and the MSDS sheet for this chemical is provided in Attachment 12". In Attachment 12 of Appendix 5-15, the Permittee has provided the Material Safety Data Sheet (MSDS) for Nalco Chemical *83400 Flocculant*.

A flocculant storage tote, a metering pump, a make-up water pump and an application apparatus will be utilized to inject the chemical into the stream. The flocculant injection system will be identical as the previous clean-up effort during the summer of 2009.

Sediment Control Measures

The application meets the Sediment Control Measures as required by the State of Utah R645-Coal Mining Rules.

Catchments C and E are sediment control measures that will be utilized to facilitate the containment and clean up of the additional sediment/coal fines deposited within the C Canyon Drainage from the mine water discharge at Outfall 002.

The catchments will provide sediment control by utilizing both retention and filtration of the mine water discharge. A small low-lying impoundment dam will be constructed to contain the mine-water. In addition, a series of filtering devices will be installed within the dam. The filtration is achieved by utilizing excelsior filter logs. The logs have been placed in a fabricated steel weir like structure that secures the logs in place. The weir structure allows for fast and easy replacement of the logs once they become saturated with sediment and no longer function.

The catchments will remain as permitted structures until the Division determines they are no longer required. However, as the C Canyon drainage is subject to flash flooding events (particularly during the late summer months), it's likely that the catchments will be rendered non-functional after the 2010 clean up is completed. However, the structures can be restored within a matter of three or four days should the need arise.

The disturbed areas associated with the construction of the catchments will be roughened and re-vegetated with the approved seed mix in order to provide interim erosion control (See Attachment 8).

Diversions: General

The application meets the Diversions: General requirements of the State of Utah R645-Coal Mining Rules.

Each of the catchments will utilize a 12" diameter poly-pipe with which to divert the C Canyon Drainage around the catchments in order to facilitate the cleaning and removal of coal fine material. A 12" diversion pipe will adequately and safely pass the flow given the flow of approximately 500-800 gallons per minute currently discharging from Outfall 002.

Findings:

The application meets the Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

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Mining Facilities Maps

The application meets the Maps, Plans, and Cross Sections of Mining Operations requirements of the State of Utah R645-Coal Mining Rules.

Attachment 1 of Appendix 5-15 contains a map that depicts the locations of the catchment structures. Additionally, the amendment contains Map 1-0, *Permit Map*, Map 1-1, *Location Map*.

Findings:

The application meets the Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules.

RECLAMATION PLAN

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Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The application meets the Hydrologic Reclamation Plan requirements of the State of Utah R645-Coal Mining Rules.

On page 13 of Attachment 9 of Appendix 5-15, the Permittee discusses the revised reclamation plan. As opposed to the previous clean-up operation conducted in 2009 where the catchments were reclaimed, the catchments will remain as permitted structures until such time as the Division determines that they are no longer required. However, after the clean-up operation has ended, the steel Excelsior log/filter boxes will be removed and stored off-site for future use. Interim reclamation will then be conducted in the areas where the filter boxes were located. Due to the frequency of flash flood events in the area of Catchments C and E, if the filter boxes were left in place, there is a high potential that they would be destroyed by a robust rainfall event.

Once the Division makes a determination that the catchments are no longer required, reclamation will proceed as described on pages 5-8 of Appendix 5-15

The reclamation of the catchments will include the diverting of the mine-water drainage around the area so as to allow the Permittee to work in dry conditions. The water impounded in the catchments will then be drained off and any remaining coal fine material will be removed and hauled off-site. The steel, weir structures will be removed and hauled off-site for disposal. The low-lying embankments/dams will be excavated and that material will be utilized to fill the catchments. The remaining areas of the catchments will be backfilled utilizing material from the adjacent equipment access ramps. In doing so, the stream channel will be restored as it is backfilled.

Large boulders and rocks will be placed within the channel and along the banks to mimic pre-existing channel morphology. The boulders will further act as additional erosional control until the reclaimed contours/back-filled areas are stabilized.

After all re-contouring and stream channel reconstruction has been completed, the diversion pipes will be removed. Once the diversions have been removed and the channel water flow has resumed, the final re-contouring of the channel will be done. The reconstructed channel banks will be roughened and scarified in preparation for re-seeding.

The disturbed areas will be re-seeded by utilizing a BLM approved mixture. Attachment 8 contains the proposed seed mix. The seed will be hand broadcast and then raked in. Following the re-seeding, a layer of wood straw will be scattered over the reclaimed areas. The Permittee proposes to re-seed the areas in the fall in order to increase the potential for successful germination the following spring.

On page 13, the Permittee also discusses the interim period following the clean-up of the C Canyon drainage and final reclamation. Final reclamation will be determined by the Division when it's deemed that the catchments are no longer necessary. At the time, the aforementioned reclamation techniques will be employed. However, following the clean-up of the C Canyon drainage, the catchments will remain in place. During this time, the disturbed areas of the sites will be roughened and re-vegetated with the approved seed mix in order to provide interim erosion control.

Findings:

The application meets the Hydrologic Reclamation Plan requirements of the State of Utah R645-Coal Mining Rules.

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CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The application meets the Cumulative Hydrologic Impact Assessment requirements of the State of Utah R645-Coal Mining Rules.

Catchments C and E are to be constructed within the C Canyon Drainage, which is contained within the current Cumulative Impact Area and Cumulative Hydrologic Impact Assessment.

Findings:

The application meets the Cumulative Hydrologic Impact Assessment requirements of the State of Utah R645-Coal Mining Rules.

RECOMMENDATIONS:

The application meets the Hydrologic requirements of the State of Utah R645-Coal Mining Rules and should be approved.

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